

ANNEX

TABLE I

Condition	Item	Values ⁽¹⁾
a	Ratio of viewing distance to picture height	3
b	Peak luminance on the screen (cd/m ²) ⁽²⁾	150-250
c	Ratio of luminance of inactive tube screen (beams cut off) to peak luminance ⁽³⁾	≤ 0.02
d	Ratio of the luminance of the screen when displaying only black level in a completely dark room, to that corresponding to peak white ⁽⁴⁾	approximately 0.01
e	Ratio of luminance of background behind picture monitor to peak luminance of picture	approximately 0.15
f	Illumination from other sources ⁽⁵⁾	low
g	Chromaticity of background	D ₆₅
h	Angle subtended by that part of the background which satisfies the specification above ⁽⁶⁾ . This should be preserved for all observers.	53° H x 83° W
i	Arrangement of observers	within $\pm 30^\circ$ horizontally from the centre of the display. The vertical limit is under study
j	Display size ⁽⁷⁾	1.4 m (55 in)

⁽¹⁾ Values b and j are as specified in CCIR Report AT/11 (MOD Ex). As it may not be possible currently to achieve these conditions fully for tests, alternative values are given on an interim basis. It should be recognized, however, that the results of tests conducted under the interim conditions may not be, in general, comparable with those obtained in situations in which Report AT/11 (MOD Ex) presentation objectives apply.

- (²) Peak luminance on the screen corresponding to the video signal with 100% amplitude. Values ≥ 70 cd/m² should be used until the specified level becomes technically feasible.
 - (³) This item could be influenced by the room illumination, as well as the contrast range of the display.
 - (⁴) Black level corresponds to the video signal with 0% amplitude.
 - (⁵) Room illumination should be set in order to make it possible to satisfy the conditions c and e.
 - (⁶) A minimum of 28° high x 48° wide is recommended.
 - (⁷) Values ≥ 76.2 cm (30") should be used if displays of the specified size are not available.
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ATTACHMENTS

DECISION STATUS SUMMARY
FCC ADVANCED TELEVISION ADVISORY COMMITTEE
PLANNING SUBCOMMITTEE WORKING PARTY 6
SUBJECTIVE ASSESSMENTS
MARCH 1990

<u>ISSUE</u>	<u>DECISION</u>	<u>INTERIM PERIOD</u>	<u>REFERENCE</u>
<u>Test Material</u>			<u>PSWP6-0070</u> <u>0084a0115a</u> <u>0050</u>
Motion and Still	create a pool by PSWP1 Attributes	2 & 3	
Pix Qual Reference	SMPTE 240 M	1 & 2 & 3	
Pix Imp Reference	test pix unimpaired	1	
Number of Segments	20-25/ Quality test 3/Impairment test	2	
Length of Segments	10 seconds	2	
Distribution	none: hold briefings	3	
Random Orders (#)	2 plus repeats	3	
Source Formats	1125/60 & 1050/59.94 2:1 787.5, & 525/59.94 1:1,	2 & 3	
<u>Subjects</u>			<u>PSWP6-0050</u>
Viewer Population	Experts and non-experts		Section # 1.3.1.1,
Viewer Demographics	young/normal, interested in TV or other pictures		1.3.1.2, 4.3.1.1, 4.3.2.1,
Viewer Number	A minimum of 20*	2 & 3	4.3.3.1, 4.3.3.2
Vision/ Hearing tests	normal "by report"*	1 & 2	

* Decisions were changed and/or re-deliberated

<u>ISSUE</u>	<u>DECISION</u>	<u>DATE</u>	<u>REFERENCE</u>
<u>Quality Tests</u>			<u>PSWP6-0050</u>
Test types	Basic Received Quality, 2 Impaired and Unimpaired NTSC Compatible Quality		Sections # 3.1, 3.2, 4.3.3.1.1 4.3.3.1.2
<u>Impairment Tests</u>			<u>PSWP6-0050</u>
Impairment Ranges/ Threshold tests	by "experts"		Section # 1.3.1.1- 3
Desired/Undesired	ATV into NTSC NTSC into ATV ATV into ATV		4.3.3.2.2
Type: Subjective & Ranging	co-channel, noise, 2 & 3 U&L adjacent channel, microreflections & multipath, UHF Taboos		1.3.1.2, 3.3 & 3.4
Type: Threshold &/or RRO, EO&C	hum, discrete frequency, 2 & 3 intermodulation distortion, cross modulation distortion, high level sweep, dual channel artifacts, ICPM, impulse noise, UHF Taboos, group delay, side panel artifacts, conditional access systems and subjective resolution		1.3.1.1
Undesired Test Material	1) fades, zooms & cuts* 2 & 3 2) a warbled swept tone* (both under study)		
<u>Equipment</u>			<u>Doc</u>
Display size	approx 70"*	2 & 3	
Display type	projection *	2 & 3	
Viewing/Listening Studio conditions	per CCIR		PSWP6-0050
Aspect Ratio	test picture: per proponent* reference picture: 16:9 3		

* Decisions were changed and/or re-deliberated

<u>ISSUE</u>	<u>DECISION</u>	<u>DATE</u>	<u>REFERENCE</u>
<u>Procedures</u>			<u>PSWP6-</u> <u>0084a0115a</u> <u>0050a0031a</u>
Ranging tests	expert panel agreement	1	
Test Methods	Primary: CCIR Double-stimulus pair-comparison Secondary: Graphic, Threshold (Staircase) and Magnitude Estimation		
<u>Psychoacoustic Tests</u>			<u>PSWP6-0039</u> <u>& 0130</u>
Test Method	Pair-Comparison	2	
Time Schedule	Downstream *	2 & 3	
<u>Undecided</u>			
Generation Method for Test Material (transcoder vs. multistandard production)			
Prioritization of Interference & Other Impairment Tests			
Expert Panel Make-up and Responsibilities			
Mechanism for "on-the-spot" Decision Authority			
Undesired Test Signals			
Additional Subjective Test Site (in U.S.)			
Ownership/Copyright Motion Test Materials			

J. Chairman's Report: Working Party 7

Advanced

TV

**Advisory Committee on
Advanced Television (ATV) Service**

APPENDIX J

PS/WP7-0079

15 Dec 89

07 Feb 90

Doc. No. _____

Date _____

**Federal Communications Commission
Advisory Committee on Advanced Television Services
Planning Subcommittee
Working Party 7: Audience Research**

SECOND REPORT

February 1990

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ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE

Planning Subcommittee

Working Party 7 (Audience Research)

SECOND REPORT

February 1990

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ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE

Planning Subcommittee

Working Party 7 (Audience Research)

EXECUTIVE SUMMARY

The work statement for Planning Subcommittee/Working Party 7 (Audience Research) called for three basic activities to be completed. First, an audience research program to assess reactions and valuations of advanced television systems should be defined in terms of methodology, costs, timetable and other support required (e.g., equipment, facilities and programming). Second, a plan for developing financial support to undertake the recommended research program was required. In the issuance of its first report in March 1989, WP7 set forth broad parameters of an audience research program. In its second period of work which concludes with this report, substantially greater details regarding the research program have been developed and a financial plan has been proposed. Third, consideration of research to study audience reactions to letter box displays was requested.

While the research program proposed here is quite advanced in terms of details, final decisions have not been made about the exact nature of the research implementation. All research requires trade-offs and WP7 concludes it makes the most sense for the ultimate funding agency to have involvement in reaching these decisions. Instead, WP7 has collected what it feels are the top research approaches the industry has to offer at this time. Nonetheless, there are specific areas of improvement in this plan which WP7 is committed to pursuing in its third period of work.

The entire research program, consisting of three separate studies (some multi-phased) could take up to 36 months and up to \$8 million to complete. It is likely that the program can be completed satisfactorily in 12-18 months for perhaps \$850,000, including some in-kind support of equipment and programming. A financial plan for raising and disbursing funds will be undertaken in accordance with the FCC's policies and practices. WP7 will continue to coordinate with the Advanced Television Test Center's work on audience reactions to letter box displays.

ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE

Planning Subcommittee

Working Party 7 (Audience Research)

SECOND REPORT

OVERVIEW

This is the second report of Working Party 7. In its first report, submitted in March 1989 to the Planning Subcommittee, WP7 proposed a tentative plan of audience research consisting of four studies. WP7 was asked to reconvene and further refine details regarding research design, timelines and costs, including a plan for raising necessary funds. In addition, WP7 was asked to consider research to explore audience reactions to letter box displays.

In this report, a brief background is provided. The next section reports the procedure adopted by WP7 to develop the best possible information on the parameters of a desirable and practical research program to investigate audience reactions to advanced television systems. The next sections provide specific details about the studies which WP7 recommends be undertaken. Finally, the next steps for WP7 are outlined.

Three appendices contain (1) minutes of WP7 meetings in the second period of work, i.e., since the March 1989 report; (2) documents list; and (3) list of participants and interested parties.

For further information, please contact either the chair or one of the vice chairs.

BACKGROUND

In December 1988, Working Party 7 was given the charge of investigating audience reactions to and valuations of advanced television services. WP7 held its first meeting on January 11, 1989. Three meetings and thirty-two documents later, WP7 made its first report in March 1989 to the Planning Subcommittee (PS/WP7-0032). In this report, WP7 tentatively proposed an audience research program consisting of four different study approaches. These studies were designed to be complementary and relatively exhaustive in terms of addressing the key research issues judged to be of concern in the FCC's advanced television standard setting process.

In May 1989, the working party was given a new charge by the chairman of the Planning Subcommittee. WP7 was asked to continue its detailed planning of the audience research program and develop estimates of the costs involved.¹ Additionally, WP7 was charged with a new task, to "consider and define a first test to determine the acceptability of the use of a letter box display as compared with the normal full screen display, and prepare a cost estimate of such a test."

In response to this new charge, WP7 convened four new meetings and more than doubled its inventory of documents. To develop the required precision for establishing research details, costs and timelines, WP7 concluded it was necessary to issue Requests for Proposals (RFPs) to the research community to solicit their professional and experienced input.

This second report of WP7 summarizes this effort and presents our current thinking as to the most desirable research approaches, likely costs and timelines required and specification of the necessary equipment and programming support. Clearly, the cooperation of the system proponents and others in the advanced television community in terms of hardware and programming support, is required for any audience research ventures to be practical in terms of cost-effectiveness and technical feasibility.

¹ See PS-023, May 15, 1989.

WP7 (AUDIENCE RESEARCH) SECOND REPORT
February 1990

THE WP7 ADVANCED TV RESEARCH PROGRAM

The effort which culminated in the issuance of the first report from WP7 represented the best thinking of the group with respect to details regarding research design, timelines and costs for the four studies – TV Store Study, Technical Study, In-Depth Study and Advanced Television Study. These studies are highlighted below.

KEY POINTS FOR ORIGINAL WP7 RESEARCH PLAN.

STUDY	OUTPUT	TIME FRAME	COST
<hr/>			
TV STORE STUDY	Demand Curves for NTSC, IDTV, and HDTV	Phase I – 5-7 months (begin immediately)	\$200K-\$300K approx.
		Phase II – after Phase I (begin when systems are ready)	To be determined
TECHNICAL STUDY	Viewers' reactions to and valuation of technical attributes	5-7 months (begin immediately)	\$400K approx.
IN-DEPTH STUDY	Long-term exposure viewer evaluations of ATV	8-12 months (begin immediately)	To be determined
ADVANCED TV STUDY	Influence of other TV enhancements on ATV demand	5-7 months (can begin immediately)	\$125K-\$175K

Source: FCC, Advanced TV Systems Planning Subcommittee, *Report of Working Party 7 (Audience Research)*, March 1989, p.8.

REFINING THE ORIGINAL RESEARCH PROGRAM

Issuing Requests for Proposals (RFPs)

The study designs suggested in the first WP7 Report were preliminary in nature and designed to be suggestive rather than definitive. The designs did form the basis of a coherent and salient research program to investigate how audiences will respond to various advanced television systems. While many of the members of WP7 are experienced in the design, execution and cost of research, we felt it advantageous to involve the professional research community in our proceedings.

To do this we reformatted the study concepts into Requests for Proposals (RFPs) and issued these to the research community (PS/WP7-0038). The RFP package contained four separate RFPs, one for each of the studies described above in Table 1. The RFP package was sent out to more than 80 research vendors on September 12, 1989.

Context for the RFP Process

In the RFP materials it was explained to the research community that WP7 was requesting their participation in a very important public policy undertaking which involved their expertise in consumer research. The RFP materials made clear that: (1) no public funds were currently available to support the WP7 research program; and (2) any proposals submitted in response to the RFP process would be entered into the public record as an exhibit of WP7's activities.

Specifications

Three basic specifications were set forth in the RFPs. First, WP7 offered to help the researchers interested in responding to the RFP in whatever manner was most effective. For example, some of the research firms expressed the need to receive some kind of support in securing the necessary facilities, equipment and

programming for this research. Many of the firms only tried to estimate their own direct research costs and not these indirect support costs. The expectation is that hardware and facilities along with much of the stimulus programming can be donated or obtained very cost effectively.

Another specification was that the research was to strive to achieve a natural setting, where appropriate. The third specification was that, while details regarding research methods, such as sampling, selection of variables, stimulus materials, etc., have been suggested in the RFPs, final determinations will occur as a matter of joint negotiation between the eventual funding agency and the selected research vendor(s).

RESPONSES TO THE RFP PROCESS

The responses to the RFPs were due by October 18, 1989. WP7 received over twenty proposals from more than a dozen different researchers and research firms ranging from academic institutions to prominent consumer research firms. These responses were considered in a preliminary manner at the October 18, 1989 meeting of WP7 in which the research vendors were invited to participate.

RFP-3 (In-Depth Study) Put on Hold

WP7 concluded that based on the low level of interest in tackling the third study, (In-Depth Study) that it be put on hold for the time being. The major reason for not trying to conduct the study was the recognition that insufficient programming material exists for any long-term viewing/exposure research. When a much greater amount of advanced television programming covering different content areas become available, it would then be desirable to try to conduct this research.

Subcommittees Formed

To sort through the variety of creative and promising approaches to the remaining three studies suggested by the various research vendors, three subcommittees were formed under the direction of Rich Feldman (RFP-

1: TV Store Study); Howard Miller (RFP-2: Technical Study); and Russ Neuman (RFP-4: Advanced TV Study). The task of these subcommittees was to: (1) thoroughly discuss the proposals received; (2) identify which proposals appear adequate to address WP7's research agenda; (3) assess the extent to which the original study envisioned by WP7 needs to be reconceptualized; (4) make any further recommendations.

OUTCOME OF THE RFP PROCESS

WP7's Goal

It was WP7's goal to develop a set of research plans, complete with cost estimates and timelines, that had adequate specificity to serve the needs of the parent Planning Subcommittee. In addition to these research plans, it was desirable to identify a set of research vendors capable of and interested in performing this innovative consumer research. The major function of this Second Report is to summarize this activity.

It was not WP7's goal to select "winners" in the RFP process. Clearly, this would be the role for the funding agency, whomever this might be. By identifying research vendors who have viable research plans, it was WP7's intent to leave the final decision and negotiations to the group which ends up funding the research so that they can have an instrumental role in making the final trade-off decisions regarding the implementation of the research. We recognize that in any research project, trade-offs are necessary and it does not serve the broader interest to perhaps prejudice research vendors from further consideration by any potential funding agency unless their basic research plans were just not viable.

Therefore, the major goals set forth by WP7 were to answer the questions of (1) what would detailed research designs look like; (2) how much it would cost (3) and how long would it take.

Description of the Research Plans

In the next sections, we highlight the three research approaches.

RFP-1 – TV STORE STUDY

Summary of RFP-1 (TV Store Study)	
Vendors:	Eight vendors submitted proposals
Costs:	Proposals range from \$250,000 to \$400,000 (includes most equipment, facilities and programming)
Timeline:	12-24 weeks to completion
Recommendation:	Proceed, current proposals present viable solutions.

Summary of Responses

There were eight responses to the RFP for a TV Store Study of the demand for HDTV. This study focuses on developing a demand curve for HDTV, as compared to NTSC and IDTV. It will be most useful in understanding how large the initial market for HDTV will be, and whether it is a niche or a mass market product.

All of the proposals followed the RFP design rather closely, and it is likely that each of them could be revised to meet the needs of WP7. In price, they range from \$105,000 to \$400,000. While not always clearly stated, we assume that all these prices are exclusive of material generation and equipment rental or purchase. Of the proposals with timelines, the range was 12 weeks to six months from the commissioning of the study until its completion. Again, material production time was not included in these estimates.

Evaluation of Responses

While it is not the intention of the group to pick a "winner," we have selected three of the proposals that are more equal than the rest. The criteria used in evaluating these proposals are as follows:

1. **Data Analysis.** The level of sophistication and appropriateness for addressing the issues outlined in the RFP.
2. **Research/Design Method.** Soundness of proposed design, and appropriateness for addressing the issues.
3. **Practicality.** Degree to which the proposal could actually be implemented as described, with only minor revisions.
4. **Value.** Information gained as a function of cost-per-interview.

The best three proposals are (in alphabetical order with document numbers in parentheses): **Marketing Metrics (PS/WP-0047); ViewFacts (PS/WP7-0043); and Daniel Yankelovich Group (PS/WP7-0041).** However, none of these proposals are acceptable without some additional changes. For example, one of the firms relies solely on conjoint analysis and never obtains a clean measure of purchase intent.

Had we completed an iterative process whereby suppliers were asked to modify their proposals to meet the Working Party's needs, it is our sense that all of the research vendors would have relatively similar designs and measures.

Programming Requirements

At a minimum, four different segments of programming will be needed. Each segment should run 5-15 minutes. The segments will include news, sports, feature film, and a situation comedy. The news segment will probably have to be shot specially. The other segments can hopefully be taken from existing material. Each segment will have to be available in 1125/60, and converted with pan and scan to NTSC. Additionally, we will have to produce a 2-4 minute "sales pitch" for HDTV. This piece can be shot in either NTSC or HDTV.

Hardware Requirements

In terms of hardware, the minimum requirements are:

Monitors

- I NTSC 31 inch direct view
- I NTSC 46 inch projection

- I IDTV 31 inch direct view
- I IDTV 46 inch projection

- I HDTV equal height to 31 inch/4:3 aspect ratio set
- I HDTV equal height to 46 inch/4:3 aspect ratio set

- I Studio quality NTSC recorder

- I Studio quality 1125/60 recorder

Much of this equipment should be available for lending by various organizations. For example, the 1125/60 recorder can be analog or digital. Since digital recorders are due to be shipped soon, this may free up some of the analog machines in short order. It is possible that the IDTV sets will not be available with high enough quality to make testing useful. In this case, the research design will be revised.

Study Cost Estimates

Judging from the proposals, the study will probably cost between \$250,000 and \$400,000 to complete. This estimate adds an additional margin of \$100,000 to the prices bid by the vendors to accommodate the anticipated additional costs of production and hardware. This margin could be reduced substantially by in-kind donations of support by interested parties.

RFP-2 - TECHNICAL STUDY

Summary of RFP-2 (Technical Study)

Vendors:	Eight vendors submitted proposals, four asked to bid in second round, one of these vendors has since dropped out.
Costs:	Median cost is \$178,000 (ranging from \$50,00 to \$6-7 million annually for 3 year program). Final costs need to be re-estimated if two phase approach is adopted.
Timeline:	Current proposals specify 2-36 month timelines. Subject to respecification.
Recommendations:	Adopt two phase approach: Phase I = NTSC versus 1125/aspect ratio; Phase II = Interlaced versus progressive, resolution (525/787.5/1050), transmission degradation). Phase II can commence when specific equipment and programming becomes available (perhaps within 12 months).

Summary

It is our recommendation that a two phase research program for the purpose of obtaining complete and valid information as outlined in RFP-2 be adopted. A number of the key variables outlined in RFP-2 can be tested in the very near future by using equipment and programming which are currently available in the marketplace. The remaining key variables would be tested in a second phase as additional equipment and programming materials become available. If we do not separate the program into two phases, it could be another year or more before any consumer data will be obtained.

The working group recognizes that one vendor has the equipment to test some of the remaining variables which we have proposed to be studied at a later date. Their conditions were that the work be carried out at a single location rather than at four or more geographically separated locations as recommended by the other

vendors. In addition, they would expect program material to be made available by PS/WP6. Several of the variables which this vendor could evaluate relate to parameter values which they are pursuing as a systems proponent.

While we recognize the need for determining consumer reactions to those parameters as well as the ones we are suggesting, we believe it is best to defer testing of those variables until similar characteristics of the other proponent systems can be tested at the same time. We think it would also be desirable to make it possible for all the potential research vendors to have equal access to the necessary equipment and programming material to enable all of them an equal capability to carry out the research.

We believe this conservative two phase approach will be advantageous to the Advisory Committee in that it serves to expedite the consumer feedback on some of the most crucial variables under consideration, while avoiding any implied bias in the study program.

Phase I

Phase I of the study should test the following variables of the current 525 NTSC system versus the 1125/60 high definition system:

- I aspect ratio
- I viewing distance
- I screen size
- I program content
- I resolution
- I lighting (dim and normal)

In addition, viewing angle should be taken into consideration in the survey methodology. Pricing and intent to purchase may be included as one possible measure of strength of preference. Wide screen NTSC and

random noise interference might also be added if appropriate programming and hardware can be made available to all bidders prior to final contract award.

Phase II

Phase II of the study could test part or all of the remaining variables such as:

- | 525, 787.5 and 1050 line progressive scan systems
- | 1050 interlaced system
- | scanning techniques: interlaced versus progressive scan comparisons
- | spatial versus temporal resolution comparisons
- | transmission degradation
- | 5:3 versus 16:9 aspect ratio

Vendor Updates

Four vendors have been asked to update their proposals to reflect such a two-phased approach, including an option to include the two additional variables under Phase I. Pricing for the second phase will, of necessity, be less firm than the first. One vendor has expressed a disinterest in continuing their work with WP7. Their view is that since they are a relatively small firm, it is not cost effective for them to become involved in a lengthy bidding process.

Discussion of Phases I and II

With regard to system type, since both equipment and programming material are now fairly widely available for the 1125/60 system, we recommend that system be used in Phase I. In addition, if NTSC receivers capable of displaying a full widescreen picture and an 1125 to 525 interlace wide screen program converter can be obtained, we should include a test of wide screen NTSC in Phase I. Since hardware and

especially programming for the other formats such as 1050 interlace, 525 progressive and 787.5 progressive are limited at the present time, the working group recommends postponing the testing of the attributes of these systems until Phase II. This recommendation could be revisited if it is not planned to perform testing until mid or late 1990.

Under the assumption that the testing will be done soon, it is recommended that the following key criteria be tested during Phase I of the research.

Aspect Ratio

Aspect ratio for the first phase can be narrowed to two forms -- either 16:9 or 5:3 as compared to 4:3. We believe either 5:3 or 16:9 are different enough from 4:3 to provide meaningful results for the first phase test. Three different variations of screen size should be considered -- equal height, equal width, and equal area or equal diagonal. Masking may be necessary to carry out these tests.

Screen Size

Three screen sizes should be tested in Phase I. Direct view screens about 25 to 30 inches and 35 to 40 inches should be considered for test. A projection screen of about 50" to 60" should be considered as the largest unit. The actual sizes to be used for the tests will have to be finalized after determination of the availability of receivers.

Viewing Distance

Two "home" viewing distances of 6 to 7 ft. and 11 to 12 ft. are recommended. The group does not believe other distances need to be tested in Phase I because a normal home room size will probably not accommodate a viewing distance much greater than about 12 feet.